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THE MOTION PICTURE CAMERA MAGAZINE

In This Issue

PSYCHOLOGICAL PHOTOGRAPHY

Making Christmas Movies

December
1943

To the American cinematographer,
his able ally the technician, and all
the rest at home and overseas

SEASON'S GREETINGS

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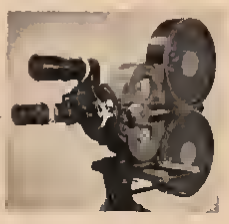

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THE MOTION PICTURE CAMERA MAGAZINE

VOL. 24 DECEMBER, 1943 NO. 12

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The Front Cover

On this month's cover is Stanley Cortez, A.S.C., Director of Cinematography on David O. Selznick's production of "Since You Went Away." It is one of those rare shots of its kind that you get when no one in the picture knows they are being photographed. The actor in Naval uniform is Joseph Cotten. The film is being produced for United Artists release.

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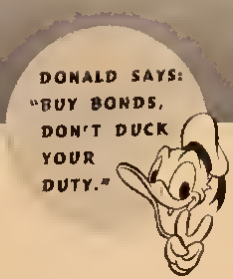

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Psychological Photography

By STEVE O'DONNELL

PSYCHOLOGICAL photography -- that is the provocative new expression used to describe the strange and subtle, but highly effective, manner in which gifted Stanley Cortez is playing upon the mind and the emotions with his camera, as he shoots "Since You Went Away" for David O. Selznick.

This technique is something new and then again it is not. It combines everything that is good in that which is old with some extremely good new ideas.

Cortez has always been known as a bold adventurer into the realm of a new camera technique. Yet he has never been a radical thinker, intent simply upon doing something in a new way, regardless of whether or not it was a better way. He has reverence for tradition for the ways of doing things that time and the experience of himself and other craftsmen have proven to be sound. So when Cortez says he has something new, you may be sure that he means something better than we had yesterday.

What, then, is the phychological photography that has everyone talking about "Since You Went Away." It is a treatment of emotional situations that unconsciously takes the onlooker through the emotional experience of the actors, as though he himself were living the part.

To understand it, you should first understand Cortez. He is a man to whom moods are of great importance. For example, he loves music, not alone for the relaxation he finds in it, but because he can create, intensify, or even change his own mood, with enough of the right kind of music. Certain combinations of sounds effect him, as they do most sensitive people, emotionally.

Now he has slowly come to the realization that sound and light are but different aspects of the same thing, so far as the effect upon human emotions is concerned. We have long been familiar with the fact that, as a general thing, allegro passages produce sensations of lightness and gayety; largo passages, sensations of depression and sadness.

Cortez has long thought that if only cinematographers could come to regard the use of light as musicians regard the use of sound, motion picture photography would take a long step forward on the road to artistic maturity.

In the past, he has experimented often, but has been restrained by various considerations from giving his dynamic concept of cinematography full reign. When he was first assigned by Mr. Selznick to shoot "Since You Went Away" Cortez determined to explain his newly developed theory in detail.

To his vast delight, Selznick quickly sensed the tremendous values in the Cortez idea of psychological photography. With characteristic daring, the man who sunk $4,500,000 in "Gone with the Wind," while critics shook their heads, and who emerged with the greatest smash hit in motion picture history, told Stanley to give his ideas free play.

The results, seen thus far only by a select few who have been permitted to view the rushes, are truly astonishing. As you watch scenes from "Since You Went Away" on the screen, you are unable to understand at first why they effect you so profoundly.

In fact, the entire picture is a slice of life today, a cross-section of America under the impact of total war.

The sequences are dramatic, surely, but they are the same experiences through which most of us are living. It would be natural to suppose that they would lose something in being translated from real life to the screen. Instead, they gain something and they strike us with greater emotional impact than the things that we see about us in these tense, historic days in which we are living.

It is Stanley Cortez, at work with his lights and his lense, at work finally with a producer of Selznick's boundless imagination. Where the average man would lay restraining hands upon Cortez, Selznick is urging him on, or, to be more exact, leading him on, for Selznick by now has grasped the implications of the psychological technique so firmly that he frequently makes suggestions on the use of lights and lense that are in advance of Cortez's own thoughts.

Of course, a complete telling of the story of this development in cinematography in its relation to the story would give away in advance much of the effective material in "Since You Went Away." But Selznick, although opposed on grounds of principle to the practice of giving away story angles, or the detail technical effects, has graciously consented to permit description of one scene in "Since You Went Away" in order to illustrate the manner in which psychological photography is employed.

There is a scene in which Claudette Colbert, Jennifer Jones, and Shirley Temple, in the roles, respectively, of Anne Hilton and her two 'teen age daughters, Jane and Brig, enter a big hotel lobby, crowded, as all such lobbies are today. They are happy and gay, in anticipation of a long-awaited reunion with the husband and father of the family, a man who has waived his 3-A draft status to enlist.

Cortez makes you feel the gayety of the three without letting you know how. There is plenty of light on this scene and plenty of motion. This brightness is infectious and seems to enter your own spirit as you watch (or, rather, experience) the scene.

They walk up to the desk and make inquiry. A telegram is handed to Claudette. It is bad news. Tim Hilton will not be able to keep the rendezvous.

You next see the three, Claudette, Jennifer and Shirley, slowly retracting their steps down a long hotel corridor. In place of the scores of bright lights which he used in the lobby scene, Cortez now uses but one and that one light casts three long shadows, sad shadows,

Three striking examples of lighting effects achieved by Stanley Cortez A.S.C., in photographing the David O. Selznick production of "You Went Away"

shadows that seem to be great weights, each weight fastened to the ankles of its owner. All the sadness usually associated with dusk, the end of the day, the finish, the frustration, is in those shadows.

You feel the emotional drag yourself and the scene leaves you limp.

That's just one small trick in phychological photography.

Here is another.

This one has to do with the Hilton home. We all know that stage sets came first, motion picture sets afterwards. Too often the pictures followed the stage tradition blindly, doing things the way they had to be done on the stage, with the obvious limitations of the stage, limitations that frequently did not apply to motion pictures.

Thus, on a stage, a room is not a room, it is three walls of a room with the fourth wall left off, so that several hundred people can look in. Thus, on the stage, it is impossible to create the effect of having the observer in the room. The best he can hope for is to get the effect of looking into a room.

When he planned "Since You Went Away," David O. Selznick decided that much of the effect depended upon taking the audience into the Hilton home. So he built the home, on two adjoining stages. He built a house so substantial and permanent in appearance that you are tempted to move right in when you see it. The fireplaces are practical, so is the plumbing.

But that isn't all.

As the action proceeds, the camera is placed, not where it is most convenient to place a camera, but where the maximum emotional effect can be created. And one of the prime emotional effects is the effect that you are *in this house*. You aren't *looking into it* as you would on a stage. You *are in it*.

Thus when Monty Woolley and Shirley Temple play a comic scene with a reluctant turtle, you are in the tiny bathroom. The scene is hilarious—as are many of the scenes between this pair in the picture—and they gain much of their power from the effect mentioned. Any cinematographer will appreciate readily the difficulties involved in getting the camera into some of the cramped spaces of the Hilton home, but the results are well worth it.

Additional sense of reality derives from a lense treatment by which Cortez is creating the illusion of a third dimension on the screen. Although lay observers are not fully aware of it frequently when one person is in focus on a screen, others in the same scene are not sharply in focus, if they are standing in different planes of depth from the camera.

In "Since You Went Away," by artful use of lighting and by unusual lense treatment, Cortez overcomes this difficulty, with a resultant effect of depth on the screen.

It is no secret in the trade by now that Selznick seems well on his way over the $2,000,000 mark on this picture. Many people have been unable to understand the reason for the great expense involved in his latest picture, but this article will go a long way toward explaining it, to technical minds, at least. There are no mobs of extras here to compare with the capture of Atlanta (although there are some big scenes, notably the hangar dance sequence). Moreover, "Since You Went Away" did not start out to be as detailed a story as "Gone with the Wind."

What is making it expensive is the striving for perfection, particularly perfection in the delineation of moods. Effects that would seem trifling to many producers are being nurtured by Selznick as though they were rare, priceless flowers. Each nuance achieves its full beauty and power.

As for Stanley Cortez naturally he is in the cinematographer's heaven. For once in his life, he is being permitted full play for an imagination of great range. His work on "The Magnificent Ambersons" made cinematographic history.

"It was good," says Stanley, "and I'm proud of my part in making it and grateful for the opportunities that were offered to me at that time to try some of these ideas experimentally. But this time I am working with a man whose imagination and courage seem to know no bounds. Believe me when I say that in Since You Went Away, the motion picture camera will take its place as one of the greatest instruments for artistic creations ever invented by man."

Kirston to Film Center

JOHN K. Kirston, formerly with Paramount Pictures and Walter Wanger Productions, has joined The Princeton Film Center, Princeton, New Jersey, as production manager. Kirston has had extensive experience in the production of training films, having completed a lengthy production assignment with the U. S. Army Signal Corps, as civilian motion picture expert, prior to joining the Film Center.

Above, Jack Smith A.S.C. At left, result of 3N5 filter. Shadows not blocked. Detail clear. Glare of sunlight on snow held back. Sky tones almost evenly with shadows

Snow Photography

By ALVIN WYCKOFF, D. Sc., A. S. C.

As Related By

JACK SMITH, A. S. C.

IT HAD been one of those hot days, sultry and sticky, that commenced with the slow rising of a coppery sun in the morning. What air circulated around us during the day floated in off the Gulf to settle around rank vegetation in the back country. With the scantiest clothing we could wear we had panted and puffed around all day with it sticking to us like an uncomfortable plaster. Now we sat out in front of our headquarters tent at the far edge of the airfield watching that coppery sun crawl down under the horizon of the Gulf, fanning ourselves into thinking the action induced a cooling effect when the conversation turned to the subject of "Snow."

Jack Smith had been up in the air most of the day—"twenty thousand feet," he said, "where it was really cool"—and now, as he wiped his face and neck dry he remarked, "I could be cooler in Africa than down here on this Florida Coast of the Gulf of Mexico."

Somebody snickered and exclaimed, "Africa'—don't be silly—it's hot in Africa—any place!"

"Well," Jack replied as he wiped away at the gathering perspiration, "I've been on location in Africa where it was as cold as any location here at home—where there was snow, deep snow, plenty of it," and then he related.

Comparing locations at home and abroad reminds me of some of my experiences in the snow, any of them as cold and shivery as the atmosphere twenty thousand feet up. One of them I call to mind was in Africa.

Incredulously the group stopped fanning and looked at him. What was the use? Africa! It was too hot to argue.

"It's a fact," he continued, "I know it sounds rather odd to associate snow with Africa but nevertheless there is considerable snow up in the Kabyle Mountains.

Frequently I find myself comparing the great differences in personal comfort and the mode of travel to and from locations here in our own country as compared to the discomforts and crude methods I have had to contend with in foreign travel. Africa has only meager transportation facilities for expedition purposes. In fact they were limited to such an extent that my personal mode of travel in the Kabyle Mountains was by the slow and stubborn acceleration of a streamlined African donkey, belly deep in snow. My camera equipment was transported on the heads of natives mushing slowly along knee deep in snow without the protective covering of boots or shoes—just a piece of automobile casing cut to the shape of a sandal and strapped on their feet. At that, they seemed quite happy and contented.

Another snow location where I encountered plenty of trouble was in central China enroute to Thibet crossing the famous Lu Pan San Pass at an altitude of 17,000 feet. At one crossing of a rushing stream of ice-cold water it required the combined force and efforts of the motor plus forty coolies pulling and pushing, to the accompaniment of shrieking shouts of blasphemy, before we could get the trucks across, and there were ten of them in the caravan, and then a route cut through snow from seven to ten feet deep before the caravan could arrive at the crest of the pass. The deep snow, the high altitude and practically no road other than a trail that had been worn by countless camel trains consumed a full day and into the night getting up over the summit. Tough going? Yes! But such are the difficulties to be overcome following trail roads to location in that part of the world.

What a contrast to the facilities enjoyed in traveling to locations here at home. For instance, compare the last two winters I traveled back and forth to locations in Sun Valley, Idaho, where I enjoyed just about every comforting luxury any traveler could wish for.

Everyone knows, and those who don't have read about it, the luxurious winter comforts of Sun Valley Lodge. When we

Upper left result of No 55 green filter Sky overcorrected Upper right, No 21 Monobrom filter used with pleasing results of dark water, soft snow detail Right used No 21 Monobrom filter, enhancing murky sky and giving transperent shadows

started out in the morning we loaded into heated motor cars Even the transporting trucks had heated cabs for the drivers. No mushing, no shivering porters, no barefooted transport carriers, no noise, no straining of muscle, cussing and yelling, just lovely smooth going in grand easy comfort

Our location was at Galena Mountain, a place that crystallized in a temperature hovering around the 40 below zero mark most of the time of day, and at night ---? Oh, boy! The mercury got stiff! But 40 below is plenty cold for anyone to work in trying to get snow scenes. We had to be particularly careful with our cameras and accessory equipment Before going into this location the cameras had to be drained of every drop of oil, otherwise the oil would have congealed and adding to the load on the motor, slowed up the normal speed of 24 frames per second.

Another important factor that had to be considered was the use of filters; the intense cold caused the jellies, inside filters, to become very brittle necessitating utmost care in their handling

Incidently, filters are an important factor in the accomplishment of effective snow photography At high altitudes the sky is reflected as a deep blue through the crystal-clear thin air and without careful judgment the use of filters will have a tendency to cause an overcorrection as compared to the landscape and ruin the realism of the scene. Generally, I use a 3N5 filter, a combination of the No 1 plus a 50 N. D. factor 4 With a general overall light standing constant at a Weston reading of around 25 little effort is required to compute the correct F value.

If at times the sky appears murky it might be advisable to use a Monobrom filter; be sure to compute the correct factor for the film it is to be used with. Since this filter is less dense than the 3N5 it is possible to cut the shutter to about 90 degrees rather than stop the diaphragm too far

There are many other conditions that arise from time to time that will require filters of other combinations One particular scene recently made I recall It was a movement of Ski troops traveling over the snow of the open mountain side and disappearing into dense wooded areas

Ski troops wear reversible outer clothing White outside when traveling through snow country to eliminate detection from the air, changing to olive-drab when approaching and entering wooded areas, blending with the very dark greens of the mountain forests and dark shadows on the snow Here the condition becomes one of careful separation. Naturally, the troops are the essential factor of picture interest backed up by the scenery around them. It is my practice in such a condition to use a green filter No 56, factor 3. This procedure calls for careful, experienced, computing to arrive at the correct exposure for the dark greens and shadows of the overall brilliances from being influenced by the considerable glare and reflection of the snow that seems to dominate the area to prevent under exposure. The olive drab of the uniforms is a much lighter shade of green than the green of the foliage and shadows that mingle with the troops, therefore, the green No 56 filter lightens the olive-drab uniforms, separating the troops from the darker foliage and shadows revealing action in excellent detail. With characters garbed in such colors that blend into their surroundings it is better to avoid the use of a filter of the red end of the spectrum Such a filter would entirely block and dull the action of the troops The effect would be a blending of the troops with the foliage and shadows with an increasing contrast of the snow The effect of a brilliant scene would be destroyed. In using the green No 56 filter in snow photography better results will be obtained by avoiding the sky as much as possible, otherwise the scene will be depressed by a sky out of all normal relation to the scene

Pola Screens must be used with caution too There have been occasions when I have had to overcome the terrific glare of back-light resting on a huge mound of snow between me and the

(Continued on Page 450)

A PLANE lands at an American air base in North Africa—a Corporal runs out, takes a package from a crew member and immediately scurries to a nearby shelter—in a few minutes he emerges with most precious military information, battle zone pictures, developed and printed.

"Pictures for the General," shouts the Corporal as he hands the package to a waiting messenger.

That's the early stage of most American drives where strategy is changed rapidly, where troops, planes and mechanized units make no major moves without first photographing the potential battle area, the placement and movement of the enemy. Prelude to attack on all battlefronts is a complete review of these aerial photographs by the strategy staff.

The prominent role of aerial photography in the present conflict has brought about increased interest in the development of photographic equipment, including cameras, developing processes, and printing methods.

Center for development of Army Air Forces aerial photographic equipment is the Photographic Laboratory of the Material Command, Wright Field, Ohio. Here, the increasing war needs for greater quantities of specialized photographic equipment are being reflected in developments which may revolutionize the field of photography.

One of the outstanding developments to aerial photography by the Photo Lab is the continuous strip printer. By this new photographic printing mechanism it is possible to turn out 1,000 prints per hour. This development was made in response to increasing demands from battle areas for quick aerial reconnaissance prints.

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AERIAL PHOTOGRAPHY FIRST STEP TO BATTLE

Aces of the Camera

John Boyle

By W. G. Campbell Bosco

BENEDICT Bogeaus, as owner of General Service Studios, has had a better opportunity than most people to study at first hand the complex business of picture making. Through his portals have passed some of the most outstanding talents in Hollywood and some of the screen's biggest hits were created on his lot.

It is not surprising then that Mr. Bogeaus, having decided to become a producer in his own right, should have assembled what looks like a sure fire combination for his initial effort. The story, "Bridge of San Luis Rey," a tale of romance and high adventure in 18th century Peru, a stellar cast which includes Akim Tamiroff, Lynn Bari, Louis Calhearn, Francis Lederer, Nazimova, etc.; Director Rowland E. Lee, and Ace Cameraman John W. Boyle, A.S.C.

It is a tribute to add to a distinguished career, as well as an indication of his own sagacity, that Mr. Bogeaus should choose to trust his maiden effort to the camera of John Boyle. Perhaps he took the cue from Samuel Bronston who made his bow as a producer with the recently completed "Jack London" on which Mr. Boyle also officiated. A producer needs to have a lot of confidence in his cameraman; John Boyle inspires confidence. John Boyle's career as a cameraman started in his home town of New Orleans where he owned and operated a newsreel known as the "Item Animated Weekly" in connection with the New Orleans Item. That was in 1913.

"I was everything to that newsreel, besides cameraman," John told us. "The newspaper would tip me off about what was happening and going to happen, and I would dash off and shoot it. Then I came back and did the lab work, shot titles and edited. And," he added with pardonable pride, "all the news up to Sunday evening was on the screen by Monday morning. Thomas Dixon brought me to California in 1915. He was the man who, needing a place to work, went out into the country and bought a lemon grove for ten thousand dollars and built what is now the Fox Studios at Sunset and Western."

Working for Fox, John Boyle trained his lens on Theda Bara and William Farnum and helped make cinematic history. It was during the filming of the "Queen of Sheba," starring Betty Blythe, that Boyle became famous for his chariot races and which led eventually to his assignment to film "Ben Hur."

It was during the filming of these chariot races that Boyle conceived the idea of mounting a Bell and Howell camera over an Akeley. It was a great idea as it turned out, not only providing insurance, and eliminating a lot of retakes by making it possible for the cameraman to get both long shots and close-ups at the same time, but it permitted him from his position in the center of the oval track to follow the entire 360 ft. course of the action without having his view cut off by another camera.

Hollywood was an exciting place in those days. An infant industry was becoming a lusty adolescent. About its name was being woven the legend of glamor and on its streets walked the great names of the entertainment world. But it wasn't exciting enough for John Boyle. He took his camera and joined the first production unit to go to the South Seas. That was in 1921.

They discovered Tahiti cinematically speaking anyway, on that trip and presented it to an admiring world. Which, we suppose, must have had some bearing on the long list of South Sea sagas that have followed.

Perhaps it was that trip that influenced Boyle's amazing career. There seemed to him to be so much of the world and what he had seen of it intrigued him immensely. So he decided to see all of it that opportunity offered.

The next year he went out to the Far East spending seven months in the jungles of the Dutch East Indies making an adventure film among the cannibals. Upon his return Sam Goldwyn sent him to Italy for a year as chief cameraman on "Ben Hur."

Returning from Italy he spent the

(Continued on Page 452)

Making Christmas Movies

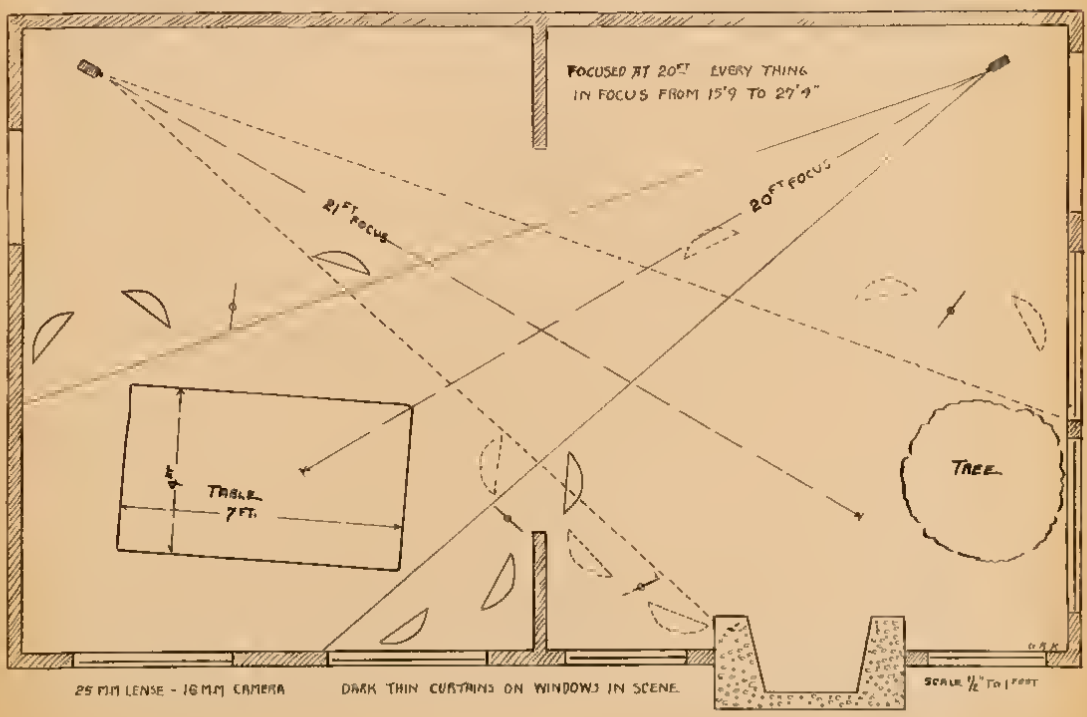
By GLENN R. KERSHNER, A. S. C.

CHRISTMAS, the one great univ sal day to you and me and to the millions on this big world is but a few days away, and I am wondering f you are planning as much fun at your house as we are at ours. When the holiday is over are you going to have movies and snap shots—PHOTOGRAPHIC RECORDS, of the day's events, of the family, the tree, lights, decorations and above all, the youngsters? Around them Christmas revolves. Their smiles are worth millions as they rush to the tree, catching up packages and gifts, flinging ribbons and wrapping paper—then the hugs and kisses.

Strange how years can slip by before we realize it . . . children can grow up to become men and women . . . get married and bring their children home many will have gone over seas . . then these photographic records, if you have made them on Christmas day, will become your most prized possessions. They have at our house.

When a youngster I always wondered why Dad and Mother and the grandparents sat around talking and trying to remind each other of things that happened years before. Now I can understand. They had no cameras, they could only talk of memories. Many times I have watched them get out the old family album of faded humorously posed photos, each made under such crude conditions. The folks had to leave the plow standing idle or lay aside the ax and travel many miles in an old wagon or

{Continued on Page 452}


FOCUSED AT 20FT EVERY THING IN FOCUS FROM 15'9 TO 27'9"
21FT FOCUS
20FT FOCUS
TABLE
7FT.
TREE
25 MM LENSE - 16 MM CAMERA
DARK THIN CURTAINS ON WINDOWS IN SCENE
SCALE ½" TO 1 FOOT

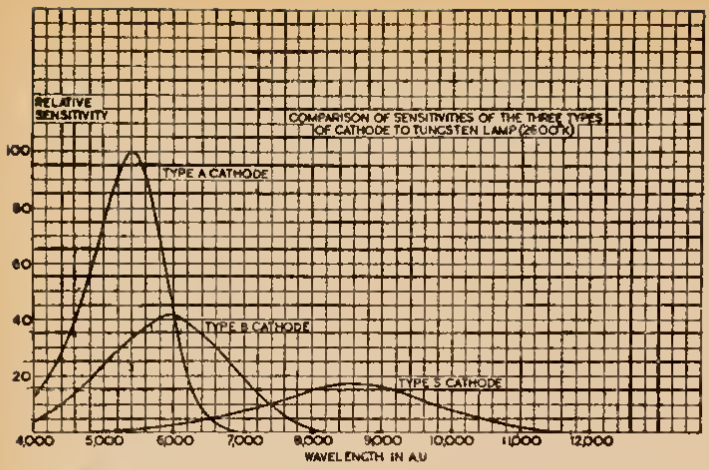


Fig. 1. Colour Sensitivity of new type Photo-Cells.

ELECTRONIC TUBES

By T. M. C. LANCE, A.M.I.R.E*

ONE of the outcomes of this war, and particularly as a result of our close association with modern American methods, will undoubtedly be the tremendous stimulus to the application of electronic art to ordinary industry and ways of life, to a degree not dreamt of by even the most imaginative engineer—and electronic engineers are on the whole the most imaginative and optimistic crowd

A rough definition of an electronic tube is a device for the control of energy, generally with the expenditure of a minute amount of control power Hence the British name of Valve. In addition, the controlled electrical energy can be directly converted into light output from the tube.

The Thyratron

The most astonishing electronic tube meeting this definition is the Thyratron or gas control tube, in some models of which powers of several hundreds of horsepower are controlled with ease and smoothness by the expenditure of only a few watts of energy.

Remote control and gradation of lighting in theatre installations has been brought to a fine art by the use of Thyratron circuits which are particularly advantageous as all the controls can be brought to one point, and the power regulation is effected without the loss of power as heat in resistances

In general the Thyratron is a three electrode valve in which gas or mercury vapor has been introduced after pumping, the characteristics being considerably altered thereby Very much higher currents will pass in the tube than in a vacuum tube, and the current will either pass at full strength or not at all, according to the potential on the control electrode. The current is only limited by the impedance of the output circuit or the cathode emission and can be of the order of amperes for even very small tubes

Under D C conditions the tube acts as a switch If a negative potential is applied to the control grid, emission of electrons from the cathode is suppressed and nothing happens, but when the control potential is reduced so that the tube starts conducting the current instantaneously jumps to its maximum value and nothing short of breaking the circuit can stop the current This effect is used in alarm circuits with thousands of applications

With A. C conditions the tube automatically extinguishes on each cycle, and if negative D C is applied to the control electrode conduction will take place whenever the proper relative values of grid and anode voltage occur. Conduction takes place for all or part of the half-cycle as desired by slight alteration of the control potential. The point is, that

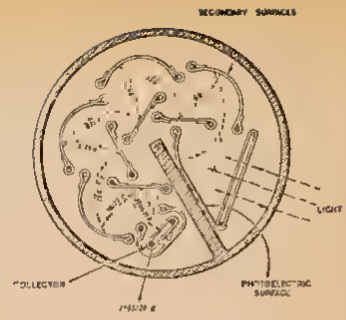


Fig. 2. RCA Electron Multiplier.

the amount of current, and hence the energy handled, is not dependent on the input control power but solely on a potential

I can picture the control bridge of a large electrically driven ship of say 50,000 H P, in which the captain himself handles the whole power control from any one of a number of small control boxes, and in addition steers the vessel by altering the ratio of power supplied to the port or starboard motors by turning small radio nobs, one for each motor.

Photo-electric Cells

Turning now from the high-powered electronic tubes to the other end of the scale, we have the photo-electric cell in which the current output never exceeds a few millionth of an ampere, and where the controlling energy is light.

I cannot visualize the time when we shall derive our electrical power by the direct conversion of light energy through the medium of photo electric cells, although we may utilize the solar radiation to heat our boilers under the control of photo-electric focusing devices to keep the installation directed at the sun

There seems very little possibility of increasing by a large factor the conversion factor of light energy into current of the photo-electric cell, which is about 20% efficiency, but considerable development has recently been made to the sensitivity of the cells to various color ranges of the incident light, to which I will shortly refer This efficiency refers to the quantum yield which for a caesium cell is ½%, but for the new antimony cells, at the optimum spectral illumination, this is estimated at 20%.

Most of you are familiar with the caesium photo-cell which has for a long time been used for the reproduction of sound on film We have all been rather contemptuous of the selenium barrier type cells, which although extremely useful in photometry and exposure meters have, in spite of several attempts, not proved really satisfactory for sound film reproduction on account of the poor frequency characteristic The manufacturing technique of these cells has recently been modified so that small cells can now be made having very reduced capacities, and it is reported that these are being made in the U S A. in thousands since the outbreak of the war

* Cinema Television, Ltd., England

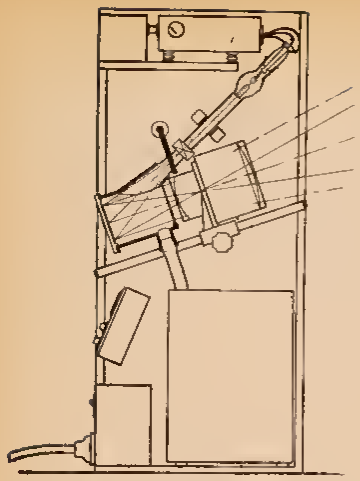


Fig 3. Baird Projection type Cathode Ray Tube

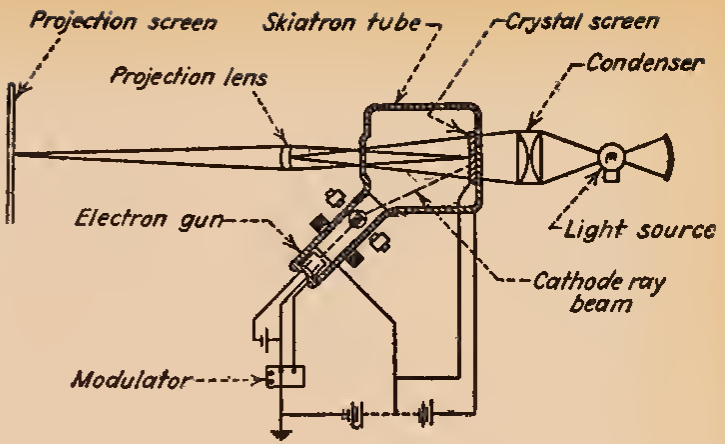


Fig. 4. Principle of Skiatron.

The size found satisfactory is 6mm. x 4mm. There are many obvious advantages in the use of this type cell, such as the low impedence of its output which enables long lines to be connected directly to the cell without appreciable loss of characteristic or without the pick up of interference. The immediate future may see the development of sound equipment without a head amplifier on the projector.

Color Sensitivity

Returning again to the vacuum types of cells: we have now produced cells of three different types with respect to spectral or color sensitivity. These differ in the preparation of the light-sensitive cathodes in an interesting manner shown in Fig. 1. It will be seen that for the light of the tungsten lamp the new surfaces, types A and B give considerably increased outputs over the old caesium cell marked S on the diagram, in spite of the fact that the peak is in an unfavorable position with regard to the color output of the lamp.

For daylight application the new A type cells are 10 to 20 times as sensitive as the S because the peak emission of the sun is much nearer the blue end of the spectrum than that of an incandescent lamp. On account of this fact alone these cells have many important war time applications.

The B type approximates very closely to the response of the eye and can be used for photometry of colored light sources and for measurements of the physiological effect of various illuminations on the eye.

Secondary Multiplication

The sensitivity of the photo-cell can be increased by what I regard as dodges, such as gas filling or secondary multiplication of the photo-electric current. We had a good exposition of this latter process by Dr. Van den Bosch at a recent B.K.S. meeting, and the Baird Television Company have made and described multipher photo-cells for television studio work which have been of great value for color discrimination purposes. More recently they have been used in applications where very feeble illuminations have to be detected. These tubes employed the principle of having several stages of secondary multiplications in one glass vessel, the stages consisting of permeable grids on which the electrons impinge, the increased number of secondary electrons being attracted through the holes in the grid in a manner similar to that described by Dr. Van den Bosch.

The RCA have recently produced a new design of multipher cell which is shown in Fig. 2. Here the electrons are directed by carefully shaped plates at different potentials so that the streams pass from stage to stage in ever increasing concentrations. These cells are very stable in operation and appear to be mass produced. This design of tube is of particular interest to electronic engineers since the shape of the plates, which would be quite impossible to calculate, was determined experimentally in large scale models in electrolytic troughs.

Thermionic Valves

This method of basing electrode designs on large scale models has been used in the production of beam power valves.

In these the emission of electrons from the cathode, instead of being a random cloud, is directed into definite beams between the control grids and the anode. Although the mutual conductance or slope, stated in terms of milliamperes per volt, is not increased, the efficiency of power valves has been considerably improved by these new designs. The net effect has been to reduce the tail of the characteristics, thereby enabling a longer load line or power output to be used for a given power dissipation in the valve.

Very little has been disclosed recently on the trend of valve design and I find myself unable to indicate future trends.

The need for high slope amplifying valves has always been present, particularly for television receivers, and there are three general lines of possible development. These are: The space charge tube which is very critical as regards voltage setting on the electrodes and is variable over age, needing constant adjustment. The conventional tetrode design with extremely small spacing of electrodes and close wound grids, which presents considerable manufacturing difficulties and is usually very microphonic; and the secondary emission tube such as the EE 50 where the slope of the valve section of the tube is increased by the action of a secondary emitting surface probably by a factor of 3 to 5 times.

Cathode Ray Tubes

The last class of energy convertors I wish to refer to is the cathode ray tube, where electrical energy is converted directly and instantaneously into light.

Unfortunately the dictates of war closed the development of television and in this country terminated the very interesting progress being made with high power cathode ray tubes for kinema television.

The Baird Company had operated in the laboratory a glass-metal projection tube which was continuously evacuated in operation, in which an illumination was obtained giving a brightness of 5 foot candles on a screen 15 x 20 feet. This tube produced an image by the electron bombardment of a fluorescent screen and research was progressing along lines of improving the fluorescent powder to control its color and increase the brightness over several hundred hour's life. The images produced on the fluorescent screen were directly projected onto the screen by lenses of large aperture.

The Diavisor Principle

It was always felt that another line of attack for kinema projected pictures would be by means of a light control in which the electronic device acted as a variable medium interposed in a beam of light, in the same way as the slide or

(Continued on Page 455)

RECENT DEVELOPMENTS IN SOUND-TRACKS

By E. M. HONAN* and C. R. KEITH**

THE considerable number of types of sound-tracks that have come into use in the past few years make it desirable to agree upon standard dimensions and nomenclature in order to avoid confusion. Steps in this direction have been taken with the publication of "Dimensional Standards for Motion Picture Apparatus" (S.M.P.E. Journal, November, 1934), and in a Bulletin of the Research Council of the Academy of Motion Picture Arts and Sciences, "Standard Nomenclature for Release Print Sound-Tracks" (November, 1937).

However, in the several years since the publication of these standards, the number of types of sound-tracks in common use has considerably increased. It is, therefore, the purpose of this paper to publish illustrations and brief descriptions of the most commonly used tracks and also some experimental tracks in order that suitable dimensions and nomenclature may be agreed upon and adopted as standards.

The accompanying illustrations show twenty types of sound-tracks and combinations of tracks used on 35mm film. The illustrations are grouped according to the type of track and without regard to the relative importance or extent of use. The description of each track is intended primarily for identification, since a discussion of the relative merits of the various types would require a very extensive paper. However, references are given to previous publications where more complete descriptions of the tracks may be found. All the illustrations show positive prints.

The first group of tracks are of 100-mil variable-density type. It will be noted that "100-mil" and "200-mil" refer to the width of film allotted to one or more tracks. Descriptions of the "squeeze-track" and "push-pull" features will be found in the references associated with tracks of these types. The use of noise-reduction in variable density recording may be observed on the film as an increase in average density in those portions having low modulation, although this is not apparent in the small sections shown in the accompanying illustrations.

(a) Single Variable-Density (100-mil).—This is a standard release track and is the same as Fig. 1 of the Academy Bulletin.[1,2,3]

Fig. A

(b) Single Variable-Density Squeeze.—This is the same as track *a* except that the width is varied to increase the volume range. It is the same as Fig. 2 of the Academy Bulletin. The width may be varied by bringing the two outer margins closer together, as shown; by keeping the outer margins fixed and inserting a black centerline of varying width, or by a combination of the two previous methods. Since the maximum track width is 76 mils, the amount of squeeze illustrated represents a reduction of sound level of only about 3 or 4 db.[4,5]

Fig. B

(c) Push-Pull Variable Density.—The two tracks are similar to *a* but are each 47.5 mils wide and 180° out of phase. This is the same as figure 7 of the Academy Bulletin.[6]

Fig. C

(d) Push-Pull Variable-Density Squeeze.—This is the application of squeeze-track methods to the push-pull track, *c*. It is the same as Fig. 8 of the Academy Bulletin.[5]

The next group are of the 100-mil variable-area type. Each is "Class A" unless otherwise noted. (See track *h*.)

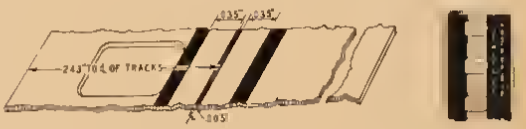


Fig. D

(e) Unilateral Variable-Area.—Noise-reduction is indicated by the change in width of the right-hand black margin. It is the same as Fig. 4 of the Academy Bulletin.[7,8,9,10,11]

Fig. E

(f) Bilateral Variable-Area.—Noise-reduction is indicated by the change in average width of the clear center portion of the track. It is the same as Fig. 5 of the Academy Bulletin.[11,12]

Fig. F

(g) Duplex-Variable-Area.—Noise-reduction in this case is indicated by a variation of the distance between the two black borders. It is the same as Fig. 6 of the Academy Bulletin.[13]

Fig. G

(Continued on Page 442)

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EASTMAN FILMS

Recent Developments In Sound Trucks

(Continued from Page 440)

(h) Push-Pull Variable-Area, Class A.—The term "Class A" means that each half of the push-pull record is complete and may be separately reproduced with comparatively little distortion. In the example shown each half is a unilateral track and the out-of-phase relation is shown by the fact that a dark projection on one side is always exactly opposite a white indentation on the other side. The same effect is obtained if each half of the push-pull track is recorded as a bilateral variable-area track. Noise-reduction is indicated by a variation in the distance between the two black borders. This is the same as Fig 9 of the Academy Bulletin.[13]

Fig H

(i) Push-Pull Variable-Area, Class B.—In this case one-half of the push-pull record represents only the positive half of the original wave and the other the negative half, so that the two halves must be reproduced with equal amplitudes and in opposite phase in order to avoid distortion. Since the print is opaque except where modulated, the usual bias type of noise-reduction is not required. The individual tracks may be bilateral, as shown in the illustration, or they may be unilateral.[11,12,13]

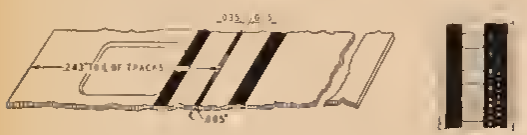

Fig I

(j) Push-Pull Variable-Area, Class A-B.—In this type of track low modulation is recorded as Class A (each track records both halves of the original wave) but as the modulation is increased it is changed to Class B by recording the additional amplitude with the positive waves on one track and the negative waves on the other. Noise-reduction is not used in this type of sound-track.[14]

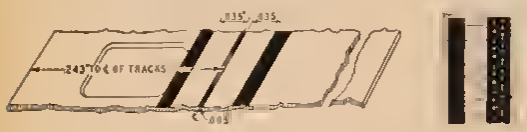

Fig J

The next group of tracks occupy a width of 200 mils and are consequently not used on present standard combined sound and picture prints.

(k) 200-Mil Variable-Density.—This is the push-pull combination of two 100-mil variable-density tracks.[6]

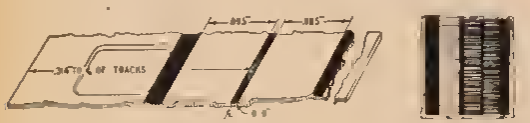

Fig K

(l) 200-Mil Variable-Area Center Shutter.—This consists of two 100-mil bilateral Class A variable-area tracks in push-pull relation. Noise-reduction is accomplished by blocking out a portion in the center of each track.[15]

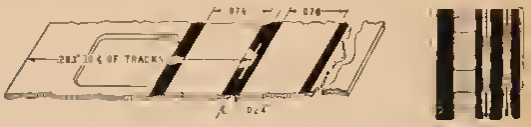

Fig L

Each of the remaining combinations of tracks includes a "control-track" together with one or more sound-tracks. The control-track is generally used to vary the sound level in the reproducing system in such a manner as to increase the volume range or the signal-to-noise ratio or both. It may be either amplitude- or frequency-modulated, and may be distinguished in the illustrations by its resemblance to a constant-frequency record. The word "comprex" refers to a system in which automatic volume compression and expansion are used.

(m) 100-Mil Variable-Density Comprex.—Both sound and control-tracks are 50 mils wide and occupy the space normally used for a standard single 100-mil track. Track dimensions are the same as for track *c*.[16]

Fig M

(n) 100-Mil Unilateral Variable-Area Comprex.—This is a combination of two half-width variable-area tracks which may be scanned by the same equipment as is used for track *m*.[16]

Fig. N

(o) 200-Mil Bilateral Variable-Area Comprex.—This track is intended for the same type of sound system as tracks *m* and *n* but utilizes a width of 200 mils.[16]

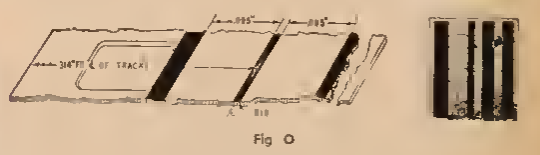

Fig O

(Continued on Page 451)

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IT'S FUN TO DEVELOP AND PRINT YOUR MOVIES

By JAMES R. OSWALD

THE ardent home movie maker like his co-hobbyist, the still photographer, should not consider himself a veteran in the field until he has tried a hand at developing his own pictures. A little knowledge of what goes on between the time the exposed film leaves the camera and is threaded into the projector, ready to show, does nobody any harm.

"But," you say, "Movie film is much more difficult to develop than ordinary roll film, isn't it? Besides, why should an amateur take the time and trouble and run the risk of doing his own developing, when the processing cost is included in the price of the film, which will be finished by the laboratory without further charge?"

The answer to the first question is definitely, no. Fundamentally, the darkroom procedure for handling movies is quite the same as with still pictures, and anyone already acquainted with the principles of developing will have little difficulty in this respect. Because movie film is necessarily so much longer than roll film it is not advisable to try to handle long lengths though, unless a special rack is made or purchased, capable of accommodating more film. There are many such fine outfits on the market at reasonable prices, but best wait until you see how much home processing appeals to you before investing in one of these. I WILL say at this time that the job requires patience!

As for the reason for an amateur to take the time and trouble and run the risk of doing his own developing, when the processing cost is included in the price of the film, which will be finished by the laboratory without further charge . . . there IS a point there! All I can say in answer to THIS query is that home processing is not practical from such a viewpoint. This article is intended for the curious, serious-minded person who likes to learn what makes things "tick," especially so far as his movie making hobby is concerned. Other readers, not so inclined, will do well to stop reading right here, as it is a sheer waste of time to continue any farther. There are many discouragements and disappointments in home processing and, as stated before, it requires almost unlimited patience, to do the work successfully. It is a job preferably for the advanced amateur, bent on seeing the process through successfully. Any one taking the time and effort to do this will be amply rewarded by the pleasure and satisfaction derived from knowing that the movies he projected are the result of his own work, ALL THE WAY THROUGH.

Now to continue with the method of procedure. As mentioned in the preceding paragraph, it is false economy to home-process the regular reversal film which is handled by the film manufacturer's laboratory. As most everyone knows this type of film is first developed to a negative, comparable to snapshot negative, and then REVERSED to a positive print for projection . . . hence the name REVERSAL film. This method is the most popular for the home movie fan because the same film is eventually run through the projector as was run through the camera. Needless to say this reduces the cost because only half the footage is required as would be were the print made on a different film, comparable to a snapshot print on paper.

If many duplicates are to be made, however, the negative-positive (2 films) system has the advantage. In this method the negative is run through a printing machine in contact with an unexposed positive film, thereby making a print for projection. This positive film is very cheap, compared to the regular type, and is extremely fine grained and has high contrast. For these reasons it is ideally suited for home experimenting, using a camera or projector as the printer, which we shall discuss later. All theatrical releases are prints from a master negative, as many copies must be distributed throughout the country. The master negative is afterwards safely stored away in the studio for future use. Because of the intensely complicated manner in which Kodachrome must be processed, it is absolutely out of the question to even consider carrying on this procedure at home, even if one has the ambition to do so.

As referred to a short while ago, your own movie camera, or projector, will serve as a printer for making duplicate copies of favorite scenes. I prefer to use the CAMERA since it is already light-tight and hence only the loading operation need be carried on in the darkroom. The projector has the advantage of accommodating longer lengths of film, but it is wiser and less costly, to conduct experiments on a smaller scale anyway, at least until the technique is mastered. Also mentioned before was the fact that POSITIVE film is ideally suited for home experimenting. Although there are many other fine types of moderately priced films on the market equally suitable for home-processing, which includes regular NEGATIVE stock, the aforementioned POSITIVE type film remains the lowest in price, costing approximately one cent

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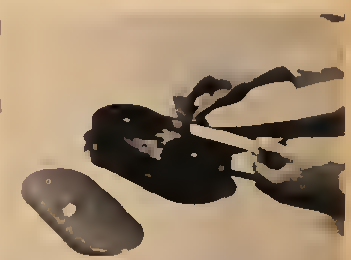

Top, a flat developing rack fits in standard size tray and holds 25 feet of 16 or double 8mm film. Next the film is wound spirally around the rack. Adjoining film loops should be kept from overlapping by pins or grooves. Third from top a contact print is made by threading the two films in the camera, emulsion to emulsion with the shiny side of the raw film facing back of camera. Bottom making titles by straight development.

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It's Fun to Develop Movies

(Continued from Page 444)

per foot in 16mm or double 8mm size The economy angle should not be overlooked, because there WILL be waste Although positive film is intended to be developed STRAIGHT, is may be reversed, the practice of which we will take up later The straight developing method is the simpler, and therefore the better to begin with

Assuming then, that a favorite scene, but one not TOO valuable to be used in experimenting, has been selected for duplicating, we will proceed with the printing. It is taken for granted that the original film to be duplicated was properly exposed in the first place, thus it will act as a sort of guide for our future efforts in this field In fact from now on it will be found very wise, indeed, to keep an accurate written statistical record of all variables . . . film type . . . source of illumination . . distance from camera, etc All these things are best determined by carefully conducted tests, since conditions vary widely, and hence no definite rules or formulas can be given Once this set of standards is correctly established, though, it will serve as a measure upon which to base new trials in time to come.

The first operation in the dark-room is loading the film. Bulk film is not daylight loading as is the reversal type, and therefore must only be opened in the dark-room Since it is not spooled, either, it should be wound on an empty projection reel, for convenience sake. (Positive film doesn't belong to the panchromatic group, which means it can be safely handled in the comfort of a regular red safe-light . . another of its many advantages). Wind the scene to be duplicated, together with the unexposed bulk film on a reel, emulsion to emulsion in such a way that the shiny side of the ORIGINAL will be facing the camera lens, leaving the shiny side of the RAW film to face the back of the camera. The next step which is threading, is done in the usual manner, making doubly certain that the sprocket teeth engage BOTH films. The customary loops, before and after the film enters the aperture gate, should be a trifle larger than normally The exposure button is then pressed a few times before the camera is closed, to see that everything is running properly.

It is safe now to light the white light, or to bring the camera outside, if the exposure is to be made by dayhght Artificial light is preferred, however, as it is always uniform, which simplifies matters in that respect

In order to have at least some idea of how to start, I will set down some figures to go by, based on my own personal experiences. This information, mind you, is only approximate and should merely be used as a starting point from which to conduct your own experiments

With the camera running at normal speed, and held 6 to 8 inches from the light source, I think your results will be quite satisfactory. For illumination, I use a 7½ or 10 watt bulb placed in a lamphouse removed from an old enlarger In front of the bulb is an opal diffusing glass, which tends to spread the light more evenly My camera has a removable lens which I take off before making the exposure Otherwise, I would suggest opening the lens wide If the exposure is to be made by daylight, point the camera towards the blank sky, not directly into the sun

Should you desire to use the projector instead of the camera as a printer, it will be necessary to employ a somewhat different lighting technique, else the entire film will become fogged. Probably the best method in which to adapt the projector for this work is to construct some sort of a small, light-tight box in which to house the printing bulb The front side of this box should be funnel shaped . . in fact a regular tin funnel can be taped on with Scotch tape The projection lens is then removed, and the narrow neck of the "funnel box" inserted in its place This neck should be approximately the same diameter as the projection lens, if possible Although the printing light will now only reach the portion of the film running through the aperture gate, it must be remembered that the rest of the film is not enclosed, as in the case of the camera, and hence the entire operation must be carried on in the dark-room. The same precautions in threading should be taken as before with the camera.

After the exposure has been made, the film is removed and immersed in a tray containing the developing solution. Regular D-72 developer, with which most of us are already familiar, can be used at the manufacturer's prescribed time and temperature. For higher contrast, especially when titles are to be reproduced, D-11 is advised. The film is then rinsed in a plain water or short-stop bath and thence in the hypo solution When completely "fixed" it is placed in the final wash water, where it remains until all traces of hypo have been removed. It is very important that the film be kept agitated throughout the entire process The final wash should be in running water, if at all possible After washing, the film is hung up to dry in the usual manner, or if exceedingly long, placed on a drying rack, which we shall discuss shortly.

When totally dry the film should resemble a regular snapshot negative of normal density. If it doesn't, there is no use going any farther until it is remade. (An exceedingly dense negative indicates over-exposure . . . a light, washed out one under-exposure). With the attaining of a perfect negative, the projection print is made in exactly the same way, by repeating the entire process

The reversal method does away with this repeat step, since the same film that was once the negative, is made into the positive projection print A somewhat different developing procedure must be followed, however, which is considerably more painstaking. After the film leaves the developer, instead of placing it into the fixing solution as is customary, it is first transferred to a bleaching bath which leaves a positive image but dissolves away the image already developed. This latent positive image, still being light sensitive, is re-exposed to the light of a Mazda bulb and then put back into the developer, thereby causing the latent positive image to become visible From here the film is placed in the plain water or short-stop bath and thence in the hypo solution, as before

I referred earlier to developing equipment capable of handling longer lengths of film For doing this, some sort of a rack is necessary upon which the film can be wound, taking up a minimum amount of space and providing easier manipulation There are several such racks on the market or, if you wish, you can construct one of your own The simplest one of these is flat and rectangular in shape, around which the film is wound spirally, and held in place by grooves or guide pins Resembling a picture frame, it can be made of wood, to any desired dimensions A rack 11 x 14 inches will accommodate up to 25 feet of 16 mm. or double 8mm. film, and is convenient in that it will fit a standard size developing tray The wood must be given a protective coating of chemically resistant lacquer.

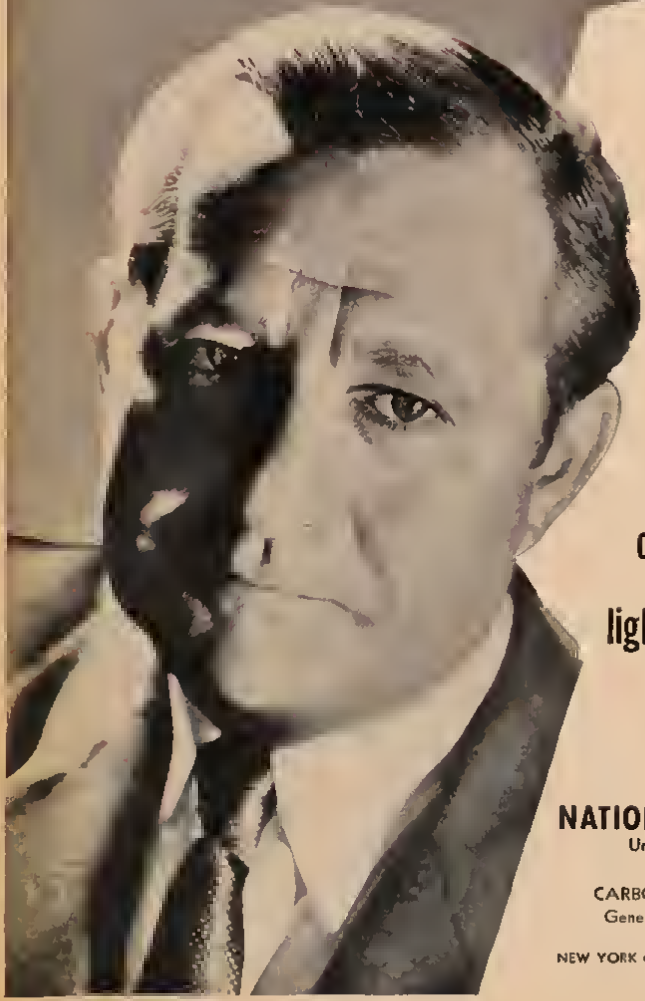
Another type rack is round and resembles a drum This kind may also be constructed of wood, making only the skeleton framework of a drum, and a support upon which it can revolve, out of wood strips. The film, as before, is wound around the rack in spiral fashion, with guides to keep the adjoining loops from overlapping A rack of this sort, because of its large circumference, will accommodate much longer lengths of film than the previously described, flat type rack. The revolving drum rack is usually made to take full 50 or 100 foot rolls of 16 or double 8mm film

Which of the two kinds of racks is the better, is a subject for debate It is argued that the flat type uses a minimum of solutions, and the film being completely submerged, doesn't run the risk of aerial fog. The drum rack on the other hand, in addition to accommodating long lengths of film, provides easy agitation because of its rotating feature. For this reason, too, it is much to be preferred for reversal processing, since more uniform exposure is possible when the film is subjected to the light for the second printing, which brings out the latent positive image

No matter which type rack is used, the film should always be wound EMULSION SIDE OUT, to prevent scratching those parts that come in contact with the framework. Because film expands somewhat when wet, some arrangement ought also be made to prevent its slackening

(Continued on Page 453)

ARTHUR EDESON, A.S.C.



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AMONG THE MOVIE CLUBS

Hirst Talks at Philadelphia

F. M. HIRST, who contributes many important articles to the AMERICAN CINEMATOGRAPHER, was the chief speaker at the November meeting of the Philadelphia Cinema Club. He spoke on "In Search of Beauty."

Mr. Hirst pointed out that the creation of a beautiful picture depends chiefly on the selection of material, the use of imagination and the feeling for design, and used sketches to illustrate the principles of composition. He then screened one of his own films, "Gloucester."

Utah Cine Arts Club

TWO 8 mm. Kodachrome films and two 16 mm. Kodachromes were the features of the November meeting of the Utah Cine Arts Club, Salt Lake City. Outstanding were "Cougar Hunt," by M. W. Robbins; "Skiing," by Norman Schultz, and "Snow White and Rose Red," by Theo. M. Merrill.

Members of the club are beginning to get excited over the club's 1943 Awards, and members have been urged to hurry their entries.

Long Beach Club

"IN the Beginning," noted film by Fred C. Ells, featured the November 3rd meeting of the Long Beach Cinema Club. This film was given an award by Movie Makers as one of the ten best pictures of 1943. Incidentally, burglars broke into the home of Mr. Ells recently and stole his entire movie equipment, amounting to something like $1500 worth of equipment he cannot replace because of wartime restrictions.

Minneapolis Cine Club

MEMBERS of the Minneapolis Cine Club are concentrating their all on the annual holiday meeting which will be held at the Leamington Hotel on the evening of December 14. There will be a turkey dinner, followed by showing of films and other entertainment in the hotel ballroom. Sounds like a good party is in the offing.

Syracusers Compare Meters

INTERESTING idea highlighted the November 16th meeting of the Syracuse Movie Makers. Members all brought their light meters and had a session of comparing meters, data, etc. Program of films followed the meter session.

Saint Louis Club Sees America

ONE of Joe Epstein's "Seeing America" films highlighted the November meeting of the Saint Louis Amateur Motion Club. It was a picture covering the Black Hills in South Dakota, Yellowstone National Park, Estes Park and Seattle, Washington. The film is on Kodachrome and made a decided hit with the members.

Also on the program was a film, "Let's Go Fishing," by Gordon R. Rader, which was a beautiful example of Kodachrome photography and scenic beauty. Third picture on the program was a war film showing the bombing of Pearl Harbor, the Battle for Egypt and many other authentic war scenes.

Metropolitan Club

FOUR films featured the November meeting of the Metropolitan Motion Picture Club. They were: "The Pageant Bubble," by Leo Heffernan, "Riches From the Sea," by T. J. Courtney, "Food For All," by Helen Loeffler, and "Desert Life," by Henry Hird of Ridgewood.

Quality of the films was exceptional. "Desert Life" was classed by many as one of the best 16 mm. films of 1941. "The Pageant Bubble" was a film about the Atlantic City bathing beauties—but was in black and white.

Brooklyn Club Sees Four

FOUR films, secured through the film service of the AMERICAN CINEMATOGRAPHER, were shown at the two November meetings of the Brooklyn Amateur Cine Club. They were: "New Horizons," "Garden Life," "The Brook," and "Santa Visits Elaine." Last named picture contained much trick photography.

Rations Disturb Frisco Club

DUE to ration difficulties the monthly pre-meeting dinners of the Cinema Club of San Francisco have had to be moved from the Women's City Club. The November dinner was held at the Stewart Hotel. Highlighting the after-dinner program were two pictures of Mexico, filmed by Rodgers Peal. One showed Mexican ruins, the other a bull fight. . . . speaking of ration troubles!

L. A. 8 mm. Elect Officers

FOLLOWING officers were elected at the November meeting of the Los Angeles 8 mm. Club: Milton R. Armstrong, President; John N. Elliott, Vice-President; W. D. Garlock, Treasurer; Merwyn Gill, Secretary. Five films were shown at the conclusion of the election.

Film Review

Review of "The Adventures of Lightning Zezall, or the Dope Wins a Contest." 400 ft. Silent with narration on records. Kodachrome.

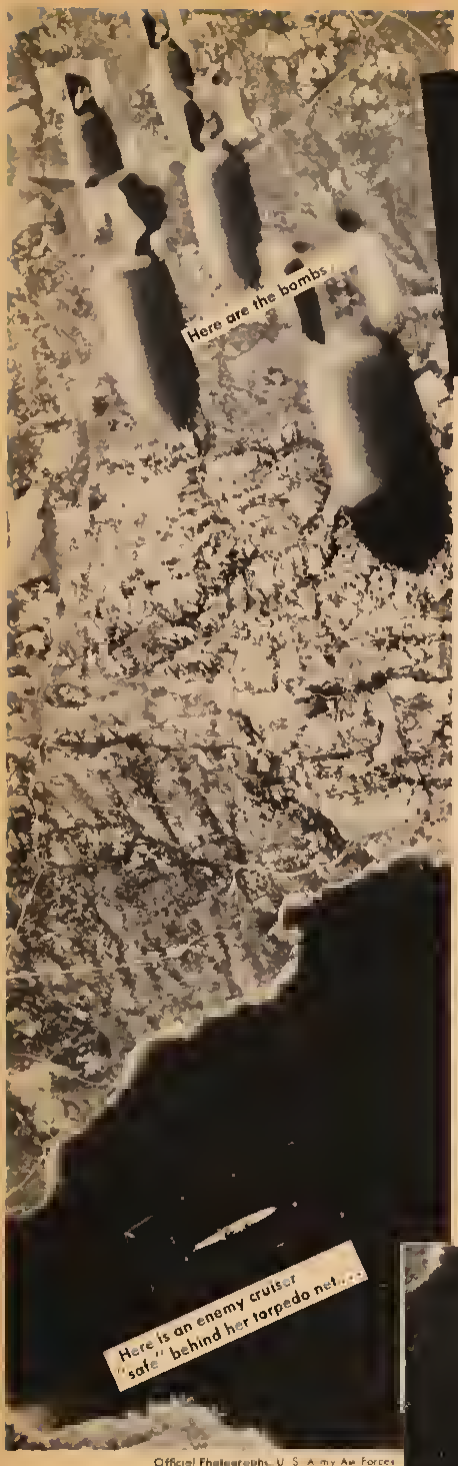
This was an attempt by the Chicago Cinema Club members to make a group film. The story and continuity was of the type that is undoubtedly of interest to the particular group who participated in filming it, but has no general appeal to outsiders. Consequently, we will only comment on the photographic treatment.

The credit titles indicate that several members were responsible for the photography and other technicalities, which in general were well handled. Most of the scenes were interiors in which the exposure was good, and surprisingly uniform, considering that various club cameramen displayed their skill. The opening titles were hand lettered, legible and well centered. Camera angles were carefully chosen, and effective use was made of lap-dissolves and fades.

Three phonograph records were supplied, intended to accompany the film with music, and narration. The usual difficulties were experienced in reviewing, trying to synchronize the projector speed with the turntable. Playing a recorded narration and dialogue in synchronization with a film is unsatisfactory, unless considerable time can be spent viewing the film and hearing the records repeatedly. Probably the group making such a production can obtain good results, after frequent rehearsals, but someone else using different equipment and unfamiliar with the records and film, finds accurate synchronization next to impossible.

A group production such as this one, would be of use to more club members, if it was made without records, and well titled. Probably, only a few members would be able to operate the records in synchronization, whereas a good titled film could be shown by anyone. The process of wording, making and cutting in properly plenty of titles is a splendid group undertaking, from which experience any member participating can derive considerable benefit, and learn how to turn out well titled films of his own.

EDWARD PYLE, JR.



Official Photographs, U. S. Army Air Forces

ON TARGET

Kodak optical systems for fire control destroy the legend of "German supremacy" in lens making

For America's bombsights—which have shown our enemies the bitter meaning of "high-altitude precision bombing"—most of "the optics" are made by Kodak.

For our Army and Navy, Kodak also makes 29 of the most complex types of optical systems for fire control—the sighting of guns—including the famous height finder for anti-aircraft

GERMANY has enjoyed a reputation for world leadership in lens making. But—as so often happens—reputation outlived performance.

Well before Pearl Harbor, Kodak optical research was developing lenses superior to any ever made by anybody, anywhere. A major advance has been the perfecting for new, finer cameras of a revolutionary new optical glass which gave lenses greater speed—definition . . . or could more than double the "field of view" of a fire control periscope.

This glass was immediately incorporated in instruments for fire control.

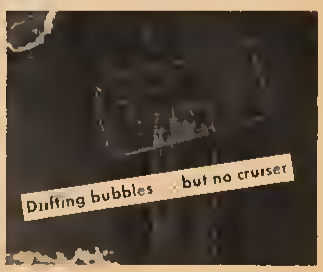
Effective fire power—hits, not "tries"—is the result of sighting through a series of lenses . . . an optical system . . . which locates, magnifies, and "ranges on" the target.

Army Ordnance experts now report "We have examined captured German sights and periscopes and, element for element, we are turning out better material."

The effectiveness of American fire power is making history. Eastman Kodak Company, Rochester, N. Y.

REMEMBER CORREGIDOR? . . . and the last words over their radio —"Just made broadcast to arrange for surrender . . . everyone is bawling like a baby. I know how a mouse feels. Caught in a trap waiting for guys to come along to finish it up." Corregidor is a stern example to us at home **BUY MORE WAR BONDS.**

Serving human progress through photography



Snow Photography

(Continued from Page 433)

scene of action The only filter I have been able to neutralize such a glare is the Pola Screen set at ninety degrees to the sun. Here again, the sky! It will be overcorrected. It is best to include as little of the sky as the composition of the scene will permit

There are many combinations of filters that can be used very successfully by the photographer of experience working in the snow country The combinations are almost endless Like artists who paint pictures, the instinct, the intuition, the inspiration and, the knowledge and experience of one man is not that of any other. For example. In snow where there is high contrast, beautiful results can be obtained with several filters, depending upon the effect desired. If the desire is to soften the contrast of white snow and dark shadows, it can be effected with a combination of the light red 23A in combination with the 56 green, computing and combination factor of 7 If the effect is to be that of a night scene, stop down an additional 1½ stops. For contrast, the 29F of the dark red end of the spectrum with its overall daylight transmission of 7 percent, factor 10, stopped down another 1½ stops will render a beautiful night effect.

Snow is so very deceptive at times. I do most of the aerial photography required by our studio and I recall one time when I was covering an assignment to get some scenes of flying through clouds I was sitting beside the pilot and suggested that "Just over there floated a beautiful cloud formation." The pilot smiled and asked if I'd like to get a closeup, and I nodded "yes" Upon getting closer to what had appeared as a beautiful cloud bank I found it to be a snow covered mountain Snow covered mountains that project up through a sea of clouds have a very close resemblance to the white clouds they are engulfed in when viewed from a distance at high altitude.

There are moments during the shortest winter days in the snow latitudes when beautiful effects can be obtained with various filters during the morning and afternoon half hour period of cross light with its long shadows resting over smooth and rough snow or casting shadows on the surface of quiet pools with ice-fringed edges. Here a K3 filter will render water of a dark texture with transparent shadows crossing the snow. A yellow-red filter will render darker water and soft shadows of the snow contours Beautiful effects can be obtained via this method where frozen-crested snow has a broken surface glinting the sunlight.

This matter of filterage when working in the snow latitudes is strictly a technique whereby an individual endeavors to manifest his own interpretation of the scene spread out before him, to express his personal impression and, is not a rule to be followed hard and fast.

Whatever the result obtained depends upon the knowledge applied to the individual filter selection for the effect he is trying to put into the photographic quality of his interpretation

The rule of filterage is not one of "thumb" but one of expression dependent upon the artistic imaginative sense of the individual photographer, the creativeness of his mental ability, achieved through a long experience of observation and extensive study of the problems pertaining to his profession.

Many times, filters can be dispensed with. The color corrective quality of the film emulsion of the standard brands will compensate adequately for the non-use of filters by rendering a truer expression than could have been obtained through the use of any filter. This result has been manifested many times when working in wet, thawing, slush-snow that is not so glaring white because it is old snow that has accumulated a dust covering since its formation; delicate reflections of sparkling light is glinted from the many little trickles of water given off by the melting snow and the darker patches of wet earth.

For me, the winter season in the snow country offers more opportunities for "mood" pictures than any other time of the year Low hanging snow clouds can add a subtle mystery to a landscape, or seascape, that will help lift the dramatic effect of the story into better suspense. Ground fog, early morning fog, low-flying scud-mists are wonderful creators of "chills" and dramatic effect

The snickery voice yawned an interruption. "It's a good story Jack, but it's time to eat After all, I guess Africa isn't so hot."

NOTE: As one of the ace directors of photography and chief aerial cinematographer with the Metro-Goldwyn-Mayer Studios, Jack Smith has made scenes for feature productions in almost every country around the earth besides adding to his credit nearly 20,000 hours of service in the air. Editor.

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Aerial Photography First Step To Battle

(Continued from Page 435)

Two of the major projects now under development at the Photo Laboratory are night photography and color photography By use of specialized night equipment including "canned daylight" Army Air Forces now take aerial photographs from 30,000 feet at night. Increasing demands for color photographs useful in camouflage detection have resulted in a concentrated development of color photographic equipment. One of the latest projects developed by photographic manufacturers in collaboration with the Photo Laboratory makes possible color aerial photographs taken at night.

Through the work at the Wright Field Aerial Photographic Laboratory the enemy is finding it increasingly difficult to keep secrets from the Army Air Forces aerial photographers whose pictures may frequently save lives and mean the difference between victory and defeat on many battle fronts

Recent Developments In Sound Trucks

(Continued from Page 442)

(p) Three-Channel Stereophonic Compex. — This arrangement consists of three 100-mil bilateral variable-area sound-tracks, one for each of the three stereophonic channels, and a fourth 100-mil bilateral variable-area track on which are recorded the compression and expansion controls for all three channels [16 17 18]

Fig P

(q) 100-Mil Variable-Density, 5-Mil Control.—This consists of a single variable-density track having the dimensions of a standard 100-mil release print track, with the addition of a 5-mil-wide control-track located in the black region between sound-track and picture. In practice the control-track is variable-density, frequency-modulated The control-track does not interfere with the playing of a film of this type on a reproducer not equipped for control-track reproduction.[19]

Fig Q

(r) 100-Mil Variable-Area, Sprocket-Hole Control-Track.—This consists of a standard 100-mil variable-area track plus a variable-area control-track approximately 100 mils wide, located in the sprocket-hole area. The width of the control-track determines the volume change and may also be used for switching loud speakers.[20]

Fig R

(s) Three-Channel Stereophonic Control-Track.—In this case three 22-mil stereophonic sound tracks occupy the space normally required for a single 100-mil track. A 5-mil control-track in the same position as in track *q* records control signals for each of the three sound-tracks. The sound-tracks and control-track are all variable-density, the control-track being frequency-modulated

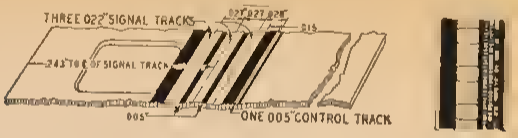

Fig S

(t) Three-Channel, "Fantasound". — This arrangement employs four 200-mil variable-area push-pull tracks, three being used for sound, while the fourth carries signals for controlling the sound volume in various loud speakers [21]

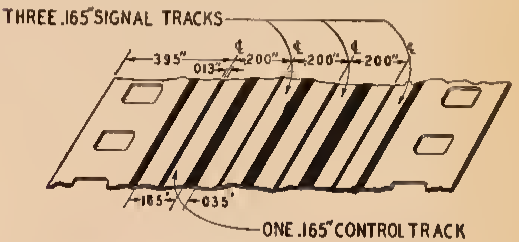

Fig T

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Making Christmas Movies

(Continued from Page 437)

hundreds of miles on horseback to a photographer with his slow wet plates, long exposures and torturous iron head braces. Surely a picture was a rare and great event in their lives But for you and me with all the fast films and modern photographic equipment right at our finger tips we have no excuse for not making pictures on this great day

We have made stills and motion pictures for over a period of some thirty years and the other night while Mrs Kershner and I were making our Christmas plans, we projected these films . . . for a few hours, time was swept away and we were whisked back to the cradle days of Robert . . we saw Tom on his first sled riding in a blizzard We laughed again when Norbert upset the turkey gravy all over his first suit and three Christmases later we watched Beverly with her candy sticky hands hugging the little kitten and wondering why pieces of tissue paper stuck to its fur and feet These and hundreds of other enjoyable incidents photographed at various places over America came to life again on the screen and refreshed fond memories All are the visable records of the children from birth to maturity to be looked at again and again and who knows, someday perhaps the children will be showing them over and over to their own children

Leafing through the albums of snap shots and photos we saw many funny ones because we had nothing better than flashlight powder Into this we would place a long fuse, light it and run for our position hoping to get there before it flashed but generally we were but a blur and moved all the others around us If not this we had our eyes closed as tight as blind people. But not today Now we have photo bulbs of high intensity for quick exposure or flash bulbs whose peak of light is so brilliant we can stop down the lens for greater depth of focus and so instantaneous the slightest move will not be seen, all without the old time results of blackening the ceiling or of burning holes in the rugs or carpet

In preparing for our Christmas day we have made plans just where we will set the tree with the miniature winter scene around it right next to the fireplace where all the stockings will hang By pushing the table over aways out in the dining room we can set up the camera, and shoot through the arch and get the children running to the tree and finding their stockings all in one scene Then when we have dinner we take the camera into the living room and shoot through the arch again giving us a good picture of the folks at the table with plenty of head room The chairs and tables in both rooms that prevent us from shifting our lights will be taken out of the room ahead of time to prevent confusion. We have set up the camera already and know just what will have to be moved and where we will have to place it and how much of the back walls we will get in the picture Colorful shawls and tapestries will be hung at just the right places to make a good color balance Green branches will be broken off the garden shrubs, stuck in cans of sand and set at places to cover up bare spots or to help in the compositions

Next we make sure all the light extensions are in shape and that the main one is long enough to reach the ironing plug and then we bring in the lights and try them out for reflections We will need some cardboards nailed on sticks to keep the lights from shining into the lens. We nail these on sticks and stand them in cans of sand We find the photo-floods from last Christmas are all right and repack them in a box and set all of it in the closet ready for use In the meantime we have had a lot of fun deciding on what colored dresses, shirts and neckties we will wear and the color of flowers, candles, favors and dishes we will use to make a color balanced picture when the turkey is carried in on the big platter

With all this planned ahead of time and prepared, confusion will be eliminated and you will get good pictures as well as having time to help the wife in the kitchen. And don't forget, making a few shots of the turkey going into the oven and when it is brought out all shiny and brown, with the wife smiling while you make it There are two suggestions I would like to make One is be sure to place the tallest folks farthest away from the camera at the dinner table By this you will give the youngsters a chance to be seen and after all they are the ones we are mostly interested in The other, do not forget a group picture with the parents, children and grandparents grouped nicely outdoors in a pretty setting for the family record If ordinary black and white, place the group in the shade so the eyes will be natural and faces not all squinted up, but if color is used plan the time of day so that the sun is behind the camera and place the group so that the sunlight falls on three quarters of the face and you will then have a good photographic record of the family on this Christmas day of 1943. If they are worth making at all, they are worth planning well ahead of time, and more so if you expect to be showing them to your children's children thirty years hence.

P S Better shop early and not put off too long the buying of your films and photo flood lights

Lantz's 'Wally Walrus'

Walter Lantz will introduce a new character which he developed in his forthcoming cartoon, 'Beach Nut' New member of Woody Woodpecker family will be known as Wally Walrus. Tuner which Universal releases starts shooting this week.

Aces of the Camera

(Continued from Page 436)

next few years in Hollywood making pictures for M G M, who during his stay in Rome had taken over the old Goldwyn company, and First National Studios Then in 1931 the travel-bug got him again This time he headed for the Scandinavian countries

Taking a Mitchell bi-pack camera, with Mrs Boyle as business manager and Ray Fernstrom as his assistant, Boyle made the first color travel pictures in Scandinavia; covering Denmark, Sweden and Finland Discovering for the cinema audiences places then little known, like Lake Ladoga, which have since become transformed into vital links with the world's future

Back in Hollywood again, Boyle broke the monotony of the next few years studio routine with trips to Hawaii and Alaska before being called, in 1935, to England for a year He arrived in England in Jubilee Year, which was all the more to his liking, to take over the camera assignment of Carol Reed's first directorial effort, "Mr Midshipman Easy," that great adventure story and perennial favorite by Captain Maryatt Down at Weymouth on location the company was fortunate in getting the permission of the Admiralty for the use of the large scale model of Nelson's famous flagship "Victory," which was on display there in connection with the jubilee celebrations, for use in the picture

"I remember one very amusing incident regarding that sequence," John told us. "We had some very realistic action, with men hidden inside the ship, shooting Very pistols through the ports to simulate cannon fire while the ship was being towed on a course that would not bring into the camera field the flotilla of modern battlewagons anchored in the bay. But there was hardly a place on the horizon that didn't have a modern battleship impeding the view. Then someone suggested that we shoot against land, with the hills as a background. That sounded like a good idea till I looked up And I decided no one would believe it The hills around Weymouth don't look like England at all They look just like California"

While he was in England Boyle received a rather unusual request from the Mitchell Camera Company It seems they had sold a couple of their cameras to the Misr Studios in Cairo, Egypt's government subsidized film studio, but when the cameras arrived no one knew how to make them work So the call went out to Boyle who flew to Cairo and showed them how

"They were very nice to me in Egypt," Boyle recalled, "and they made me many flattering offers to stay. The Government officials and everyone whom I met were most enthusiastic about the future of motion pictures in the Near East But I had to get back to England Even though the Egyptians held out the lure

(Continued on Page 454)

It's Fun to Develop Movies

(Continued from Page 446)

and overlapping the guide pins or grooves. This problem can be solved simply, but effectively, by looping a rubber band through itself, over the starting point on the rack, attaching the film to the other end by looping it through the rubber band and fastening it to itself with a paper clip or two. The tension of the stretched rubber band will keep the film taut and will automatically take care of any expansion or slackening later on. The other end of the film should be fastened to the rack in the same manner. In this way any length film up to the maximum capacity of the rack can be handled, with the assurance that it will remain tightly in place throughout the entire process.

In drying a different rack is usually used, although not absolutely necessary, especially in the case of the drum type rack. The drying rack ordinarily resembles the drum type quite closely, still holding the film in circular or squared-off loops, but is more loosely constructed than the developing rack. By that I mean the film is suported in not more than 4 places each time it spirals around the rack's circumference. Probably the main reason for using a different rack in drying, is for the sake of cleanliness in this final operation. At this stage a fresh, clean rack in clean surroundings is good assurance for a spotless film. When thoroughly dry, and not before, the film is wound on a reel, ready for projection.

It goes without saying that fresh chemicals give best results. For economy's sake, however, the solutions may safely be used more than once. If stored in a cool, dark place in well corked bottles, they will keep for a reasonable length of time, particularly the hypo. The Fromader Geneva Company of Davenport, Iowa, is one concern that can supply all necessary chemicals for reversal processing, as well as the developing and drying racks, for those desiring to purchase, rather than construct, their own equipment.

Developing and printing your own movies opens the door to many new tricks, heretofore thought impossible. Your own patience and ingenuity is the limit. For instance, a negative scene can be run through the camera in contact with an unexposed positive film to provide a motion picture background for a title, photographed in the usual manner. This also enables one to superimpose wording over previously made movie scenes, by first making a negative of them and then following the procedure outlined above. Similarly, an endless variety of trick fades, wipes, and dissolves are possible, limited only by the cameraman's imagination and ability. These transitions, and many new ones that will suggest themselves, may also be employed in scenes where they are not already present, by clever manipulations and double exposures.

Those who for one reason or another do not care for the printing stage of the work, may still find enjoyment in the developing end. Titles, especially, are frequently made on economical positive film and developed "straight" — that is without reversing the film and without making a contact print for projection. When used for this purpose, the camera is loaded the regular way, with the emulsion side of the single film out and facing the lens. It should be recalled here that the film, when developed, will be in negative form. Therefore, all title cards should also have their color values reversed from the way they are to appear on the screen. In this way the result will be a positive projection print, the same as in the case of the other methods. Bear in mind, however, that this system only holds true for titles. Regular filming cannot be carried on using only a single film, developed "straight."

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Aces of the Camera

(Continued from Page 452)

of living tax-free in their land by the Nile But I was very impressed with the country and told them I would be back At the time I had no idea it would be so soon

"In England I found myself slated to do the camera work on Walter Futter's Capitol Films production "Jericho," starring Paul Robeson, Henry Wilcoxon and Wallace Ford and released here under the title "Dark Sands" Part of the location shots had been planned for the company in Algeria But when we got there things didn't pan out right, so, remembering my Egyptian connections, I asked for help which was graciously given and off we went to the Egyptian Sudan Which was the location called for in the story anyway"

The shooting of "Jericho," or "Dark Sands," was one of the biggest adventures in Boyle's colorful career The story concerned itself with one of the most fantastic events of modern times; the annual trek made by the natives of Nigeria across two thousand miles of Equatorial Africa to obtain their year's supply of salt Banding together as a defense against the marauding Tauregs, the caravan assumes tremendous proportions. Fifteen thousand camels were in the caravan Boyle photographed

"The original idea was that we would follow them in motor trucks, equipped for the desert," Boyle told us with a grin. "But it didn't work out that way After only a few hundred miles even the specially equipped trucks refused to go any further So we followed the caravan the rest of the way riding camels ourselves" John Boyle took it all as part of the day's work But nearly 2000 miles by camel! And if you know anything about camels! Incidentally, even the reviewers who usually take the cameraman's work for granted or who choose to ignore it entirely, wrote paeans of praise about Boyle's spectacular desert sequences so brilliantly photographed in spite of the primitive conditions

Boyle's intended year in England stretched into three He worked at Ealing, Denham and Pine Wood before returning once more to Hollywood "One can't afford to stay away too long. They forget you," he observed But he wasn't back for long In 1939 he was approached by Mr Lawrence Thaw, a New York banker, who had planned a most pretentious motor expedition from Paris to India Preparations for the trip had been going on for two years, the foreign governments through whose territory the expedition must pass had promised their cooperation and the prospect of adventure beckoned. On the other hand the threat of war was becoming increasingly ominous. But the temptations of the trip were too tantalizing Boyle cast all other considerations aside and went It turned out to be one of the most spectacular assignments ever covered by a motion picture cameraman From Paris to Munich, then across Europe to Vienna, Budapest, Belgrade, Sofia and thence into Turkey, then to Syria, which they reached on September 3rd, the day war was declared From Beyreuth they went on to Bagdahd, through Persia, into Afghanistan and entered India through the storied Khyber Pass.

During the course of the trip Boyle photographed a Bedouin desert feast, the exquisite mosaics of the Pearl Mosque, and in India, where the party was entertained by nine Maharajahs, Boyle recorded with his camera the exotic splendors of Durbars, palaces, treasures and silk-robed courts of these feudal potentates many of which had never been photographed before The National Geographic Magazine carried a big spread of Cameraman Boyle's pictures along with the story of the expedition Life Magazine of November 25, 1940, devoted seven pages to pictures and laudatory comment of the film John Boyle brought back "His pictures," said Life, "not only make a series of gorgeous travelogs, they constitute a documentation of Oriental civilization that may never again be duplicated"

We asked Boyle, was there any particular reason he liked to travel so much. "Well," he said after a moment's thought, "it's a good idea to get a fresh viewpoint. If you keep doing the same thing you get in a rut" "Even in Hollywood?" we asked "Especially in Hollywood," he countered "And besides, I think it most important that we learn, at first hand, just what the rest of the world is like Here in Hollywood we make pictures with story locations in all parts of the world It stands to reason that we can be more authentic, thus adding to the sincerity of the story as well as lessening the possibility of offending native sensibilities, if we have a personal knowledge of the country in question The influence of the motion picture is so great that I feel movie makers should feel a greater responsibility in presenting factual things factually This will be particularly true in the post-war era when international cooperation will depend on international understanding"

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Girl's Idea Increases Binocular Lens Output

FOR keeping her bright blue eyes open, and her mind in the same condition, June B. Burhans, 461 Avenue D, has been given a $430 check by the Bausch & Lomb Optical Co.

Miss Burhans, a slim young blonde, is believed to have won one of the largest awards ever given to a woman for technical suggestions. At least she tops any previous woman worker with the company. She took advantage of the company's suggestion system to submit an idea for combining operations on certain optical parts which substantially increases production.

Objectives and eyepieces for binoculars are made of two elements cemented together and aligned optically. Ordinarily these lenses are matched, cemented, cleaned, and inspected, then transferred to another section where they are reheated, trued on an optical truing machine, cleaned and inspected again.

Miss Burhans conceived the idea that all these operations could be done at the same time and on the same bench. One girl could clean, then heat the lenses, cement them together and true them while still warm. A small plunger type fixture was designed and built in the company's machine shop for the truing operation and the basic idea made good. In practice, a team of two girls working as a unit was found better than one, but the basic idea remained—one heating, cementing, and truing on the same bench.

Slipped into a little plunger lathe, the cemented elements are quickly trued. Light striking the surface of the trued lens quickly discloses a reflected image which tells whether the lens elements are optically trued.

The new system raises the production of binocular eyepieces and objectives to *as many lenses in two-and-a-half days as were formerly produced in six.*

In Memoriam

Andre John Raphael Bailatier, A.S.C. Born in Paris, France, August 28, 1882. Died in North Hollywood, Calif., November 7, 1943. A beloved member of the American Society of Cinematographers for many years. His widow and his daughter are extended the sympathy of each member of the Society.

Electronic Tubes

(Continued from Page 439)

film acts as a variable medium between the arc lamp and the screen in the kinema.

This principle is covered by the title of a Diavisor, and many proposals have been put forward to give the desired results.

The cathode ray, for example, has been used to operate small mechanical shutters, to cause the orientation of small colloidal particles, and to produce birefringence in suitable substances.

The advantage of such a system in comparison with direct viewing of the fluorescent screen can only be obtained efficiently if the varying transparency values of the medium can be maintained practically unchanged over substantially the picture repetition period.

Such a tube is known as a Skiatron, and Fig. 4 shows the principle of operation. It is identical with a cathode ray tube, with the exception that the crystal screen is not luminous but exhibits an effect of electron opacity, that is, it can be rendered opaque by being scanned with a cathode ray beam. The opaque areas become transparent again after a short interval of time under the influence of heat. Research is concentrated on the production of suitable materials.

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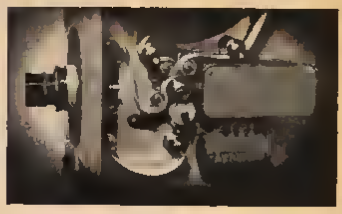

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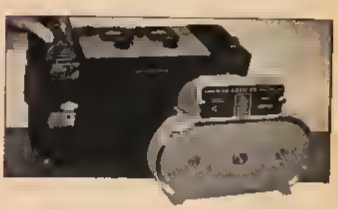

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Pictures to Teach Spanish to Troops

AMERICAN troops stationed in the Antilles will see Hollywood motion pictures with super-imposed Spanish titles to assist them in learning the Spanish language, Colonel Smathers, in charge of special services for that area, told foreign managers at a luncheon meeting at the Harvard Club yesterday.

At the request of the Colonel all the majors agreed to supply a special Antilles Dept. of the Army's special service, with three prints of all pictures directly from New York; Antilles department covers Puerto Rico, Cuba, the Dutch Island of Aruba and Curacao, and other spots. U. S. bases in the area were formerly serviced direct from company exchanges in San Juan, P. R.

Servicing of prints from here will be on the same paid basis as previously, but will expedite showings and insure earlier screenings for the troops. A film man, likely George Barnett, will be appointed to handle the Army's Antilles department from New York.

Disney Museum Trustee

Walt Disney was elected a trustee of the Museum of Modern Art at the annual meeting of board of trustees. Disney was one of the first sponsors of the Museum Film Library and one of the first to donate his films to it.

Photography War Committee

THE American Standards Association has made public a request from the War Production Board on behalf of the armed services that it set up a War Committee on Photography to develop specifications for the various types of photographic and cinematographic equipment used by the armed forces. This followed action taken by a committee in New York at which representatives of the armed services and of manufacturers of photographic and cinematographic equipment thoroughly discussed the advisability of undertaking such a job.

This committee recommended: (1) that a War Committee on Photography be set up at once, and (2) that a subcommittee of representatives of the armed forces outline the order of the work so that the most important jobs can be undertaken first.

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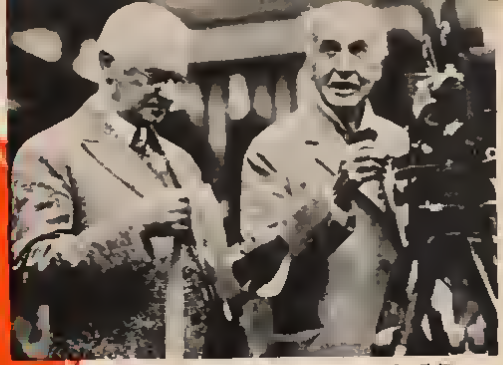

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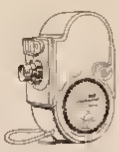
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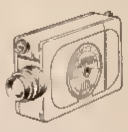
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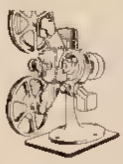
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